Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (currently amended) In a carrier recovery system in a digital demodulator, a frequency compensation method, comprising:

(i) at an input of a phase error detector, reducing, by a down-sampling factor, a symbol rate of signals received from a phase derotator and a slicer to a down-sampled rate;

(ii) detecting a carrier lock condition using signals from the phase derotator and the slicer with the down-sampled rate;

(iii) determining outputs of a phase accumulator ~~at the down-sampled rate~~;

(iv) generating extrapolated outputs between ~~successive~~ successively determined outputs of the phase accumulator ~~to generate addresses to a look-up table by combining the outputs of the phase accumulator outputs and the extrapolated outputs; and~~

(v) combining the phase accumulator outputs and the extrapolated outputs to generate addresses to a look-up table;

(vi) looking up ~~compensating~~ frequency and phase compensation offsets at the generated addresses ~~for input~~ and providing the frequency and phase compensation offsets to the phase derotator.

2. (original) The frequency compensation method of claim 1, further including determining the down-sampling factor such that a predetermined maximum allowable pipeline delay is not exceeded.

3. (original) The frequency compensation method of claim 2, wherein determining the down-sampling factor is based on the symbol rate.

4. (original) The frequency compensation method of claim 2, wherein determining the down-sampling factor is based on a data channel condition.

5. (original) The frequency compensation method of claim 2, wherein determining the down-sampling factor is programmed by an air interface processor.

6. (previously amended) The frequency compensation method of claim 1, wherein generating the extrapolated outputs includes determining a gradient of the phase accumulator outputs.

7. (cancelled)

8. (currently amended) The frequency compensation method of ~~claim 7~~ claim 1, wherein generating the addresses further includes reformatting the combined phase accumulator outputs and extrapolated outputs.

9. (currently amended) A carrier recovery system for a digital receiver, comprising:

a phase derotator for derotating a signal received from an equalizer;

a slicer, communicating with the phase derotator, for providing a quantized decision of the derotated signal; and

a feedback loop having down-sampling means for reducing by a down-sampling factor, a symbol rate of signals from the phase derotator and the slicer to a down-sampled rate, the feedback loop further including:

a phase error detector for detecting phase errors ~~of signals with the down-sampled rate~~ between the down-sampled derotated signal and the down-sampled output of the slicer;

a loop filter, a carrier acquisition control and carrier recovery lock detector for determining a carrier lock condition;

a phase accumulator for providing outputs at the down-sampled rate;

a look-up table address generation unit for generating extrapolated outputs between the phase accumulator outputs to provide look-up table addresses at the symbol rate, the look-up table address generation unit including a gradient computation unit for determining a gradient of the ~~outputs of the~~ phase accumulator output to generate the extrapolated outputs, and the gradient computation unit including means for combining ~~the outputs of~~ the phase accumulator outputs and the extrapolated outputs; and

a look-up table for generating, by reference to the look-up table addresses, ~~compensating~~ frequency and phase compensation offsets ~~for input~~ which are provided to the phase derotator.

10. (original) The carrier recovery system of claim 9, wherein the down-sampling means includes means for determining the down-sampling factor such that a predetermined maximum allowable pipeline delay is not exceeded.

11. (original) The carrier recovery system of claim 10, including means for determining the down-sampling factor based on the symbol rate.

12. (original) The carrier recovery system of claim 10, including means for determining the down-sampling factor based on a data channel condition.

13. (original) The carrier recovery system of claim 10, wherein the means for determining the down-sampling factor is programmable.

14. (cancelled)

15. (cancelled)

16. (previously amended) The carrier recovery system of claim 9, wherein the gradient computation unit includes means for reformatting the combined phase accumulator outputs and extrapolated outputs to provide the look-up table addresses.

17. (previously amended) The carrier recovery system of claim 9, wherein the look-up table address generation unit includes a multiplexer unit for providing the look-up table addresses to the look-up table.